

# Ideas Valuable to Auto Mechanics

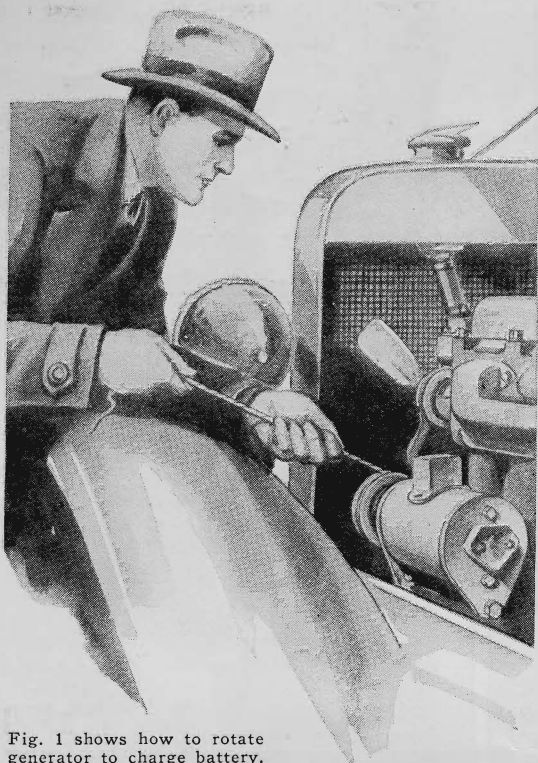


Fig. 1 shows how to rotate generator to charge battery.

**W**HEN the battery has accidentally become discharged, the hand crank will fail to start the motor. If this happens to you when you can't borrow a battery or get a tow there still is one last resort. Take off the fan belt and rotate the generator many times by the aid of a cord wound around the pulley. This will put enough juice in the battery to start the motor with the hand crank.

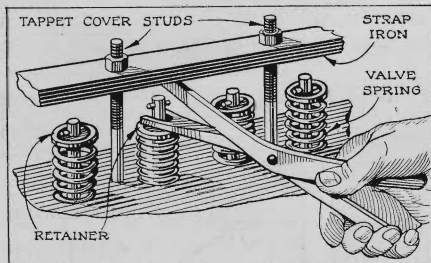


Fig. 2. A steel bar fitted to the studs affords purchase so overhead valves can be removed.

## VALVE AID

THE chief difficulty in removing valves of the overhead type by the aid of a conventional lifter is the absence of anything against which to rest the tool. A way out of this trouble is shown in Fig. 2. After the rocker arm shaft has been removed, fit a steel or hardwood bar on the studs as illustrated to provide the necessary purchase.

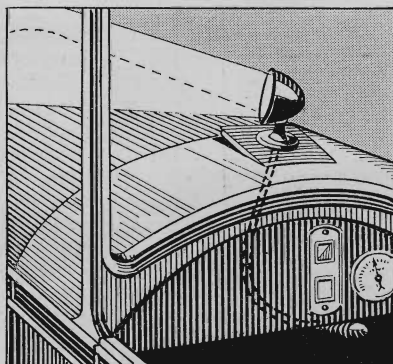


Fig. 3. Spotlight mounted on cowl ventilator can be moved with a hand lever.

## Novel way of charging wholly dead battery—How wedge closes a rim

POPULAR SCIENCE MONTHLY awards each month a prize of \$10, in addition to regular space rates, for the best idea sent in for motorists. This month's prize goes to Joe Hodge, Richfield, N. C. (Figure 1). Contributions are requested from auto mechanics.

## TIRE STRETCHER

AFTER you have labored in vain trying to hold open a tire casing while you search for the break in the fabric that has chafed through the tube, make yourself a stretcher as shown in Fig. 5. Be sure to cut the notches in the board so deep that it will not slip. While one stretcher will serve in most cases, two will often prove more convenient.

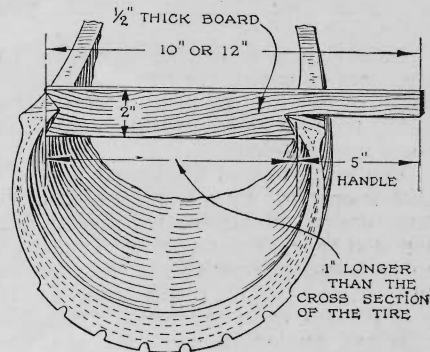


Fig. 5. Spreading a tire casing in search of a break is a small job if you use this device.

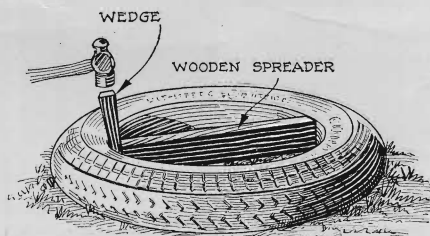


Fig. 4. A piece of board and a wedge are handy to force a rim into locked position.

## WEDGE CLOSES RIM

FIGURE 4 shows how to use a piece of board, a wood wedge, and a hammer to force a rim into the locked position. Both the board and the wedge should be made of hardwood. The board should be not less than an inch and a quarter thick and wide enough so that its lower edge will be supported by the ground.

This is similar to the common way, using a jack supported by a board to give the necessary force.

## SPOTLIGHT

ON CARS fitted with a cowl ventilator, it is often possible to mount a spotlight as indicated by the drawing in Fig. 3. Opening the ventilator will point the spotlight up as much as desired and a hand lever can be used to turn it to right or left. Of course, a ball-and-socket joint could be used on a plain cowl.

## RUBBER MAP POCKET

MAPS, route cards, and so on may be carried conveniently in a special pocket under either of the front seats. Take a section of inner tube and split it lengthwise as indicated in Fig. 6. When the pocket is in place under the seat it will hold papers so that they can not jar out. After the pocket is in place, put in the center tack. Then stretch the back edge both ways from the center and tack it securely, first on one side and then on the other to maintain even tension.

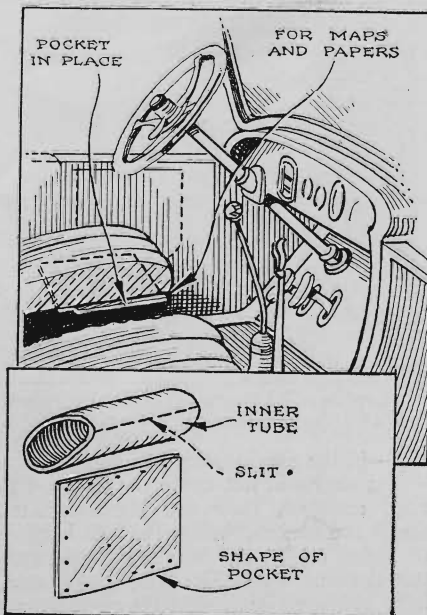


Fig. 6. A piece of old inner tube, cut to size and fitted in place, serves as pocket for maps.

# New Ideas to Help Auto Workers

POPULAR SCIENCE MONTHLY awards each month a prize of \$10, in addition to regular space rates, for the best idea sent in for motorists. This month's prize goes to Kenneth Murray, Sturgis, Mich. (Figure 3). Contributions are requested from all auto mechanics.

**I**N OLD cars it appears necessary frequently to touch up the breaker points. Many times this trouble is caused by a burning away of the end of the distributor arm which causes a long jump in the distributor. Building out this burned-away portion with solder is a semi-permanent cure for this trouble.

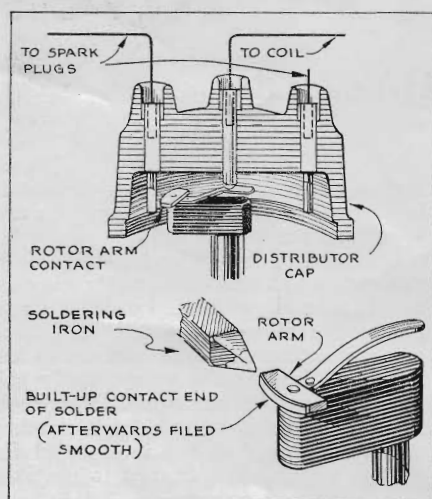


Fig. 1. Shows how to build up, with solder, the burned away end of distributor arm in an old car and make it run.

## LEAKING VALVE

WHEN the exhaust valve is leaking badly a quantity of exhaust gas is drawn back through the valve during the intake stroke. If the motor is allowed to idle at the slowest possible speed, and a piece of paper is held over the end of the exhaust pipe, the leaking valve will cause the paper to be sucked against the end of the pipe.

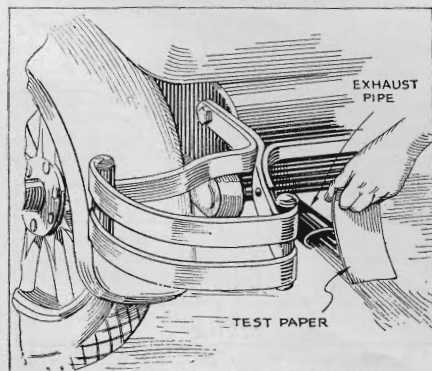


Fig. 2. If a valve is leaking badly, it can be detected at the exhaust pipe.

## ACID MAY HELP

IN SOME sections of the country, the water deposits a hard white scale on the interior surface of the radiator. Ordinary cleaning compounds are of no use in such cases. As a last desperate resort try filling the radiator with a ten percent solution of hydrochloric acid. The acid will dissolve the scale but it also attacks the metal of the radiator to some extent. If you are lucky the scale will be removed before the radiator is eaten through.



A heavy scale in radiator may be removed by ten percent solution of hydrochloric acid.

## ICY WINDSHIELDS

OF THE many simple methods of preventing ice from forming on the windshield, one of the simplest is shown in Fig. 4. Take a small bag of ordinary table salt and tie it to the shaft of the wiper so that it will just touch the glass at the upper edge of the path of the rubber squeegee. This will melt the ice.

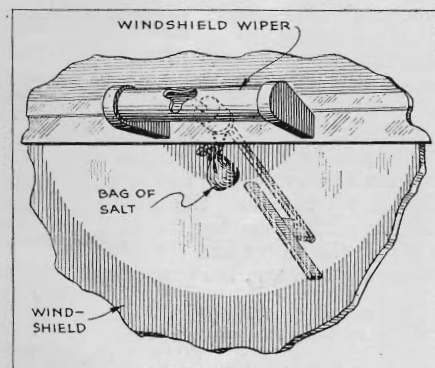


Fig. 4. A bag of ordinary table salt attached to windshield wiper will keep ice off glass.

## SIMPLE PRIMER

FIGURE 5 shows an easy-to-install priming arrangement that can be applied to almost every car. Remove the fitting that attaches the vacuum line to the windshield wiper and substitute a short length of pipe and priming cup as indicated.

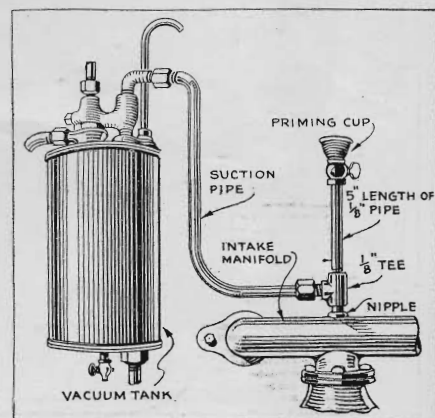


Fig. 5. This simple primer, which attaches to vacuum line, is easy to install in most cars.

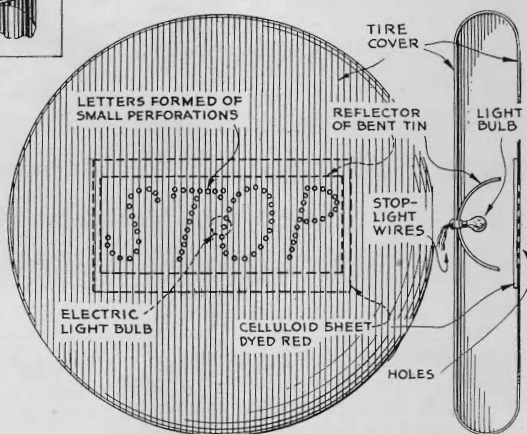


Fig. 3. This stop light is made by punching holes in tire cover and fitting bulb behind it.

## NOVEL STOP LIGHT

FIGURE 3 shows how to make a stop light that disappears when not lighted and, because of the large letters, can be seen for a great distance. Punch a series of small perforations in the tire cover to form the letters of the word "stop." Cover on the inside with a sheet of red celluloid. Fit a tin reflector and a powerful headlight bulb back of the letters and connect the bulb to the usual stop light switch. This should make a peculiarly efficient stop signal, as it appears at the most desirable height and directly in front of driver in the rear.

# New Ideas for Car Mechanics

## Brake Indicator Light Burns Only When Engine Runs—Easy Way to Wash Neglected Body Top

POPULAR SCIENCE MONTHLY awards each month a prize of \$10, in addition to regular space rates, for the best idea sent in for motorists. This month's prize goes to Archie Amos, Fort Wayne, Ind. (Figure 3). Contributions are requested from all auto mechanics.

HERE is an emergency brake indicator light with a novel feature. The ordinary method of hooking up such a light has one serious defect. If you forget to turn off the light when you leave the car, the light may run down your battery. By taking the current supply from the generator instead of from the battery wiring, the light will burn only while the motor is running and the emergency brake is set. The wiring is shown in Fig. 3. A jeweled radio indicator light or any other small light fastened to the dashboard of the car will serve the purpose.

Locate the wire that comes from the generator and connects to the automatic cut-out. Make connection to this wire as shown. Since the voltage on the generator side of the line may rise above six volts, use a twelve-volt bulb or a fixed resistance in series with the six-volt one.

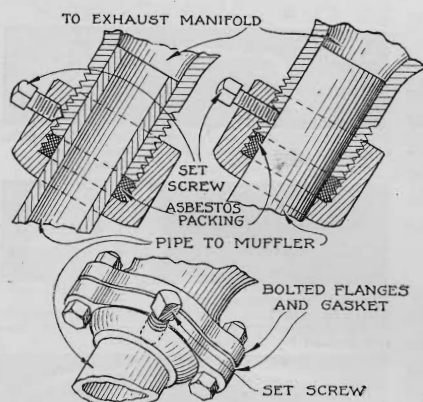


Fig. 1. Set screw in exhaust pipe manifold union holds it tight and stops escape of gas.

### EXHAUST UNION CLAMP

ON MANY engines the union that holds the exhaust pipe to the exhaust manifold has a tendency to come loose. And when it does, the leaking gas makes an objectionable noise. Figure 1 shows a way to overcome the trouble. First screw the union as tight as you can get it. Then drill a hole through the shell and tap it for a set screw. Better still, run the set screw through the wall of the exhaust pipe.

Fig. 2 shows hose attached to long handled scrubbing brush and used for convenient cleaning of car top.

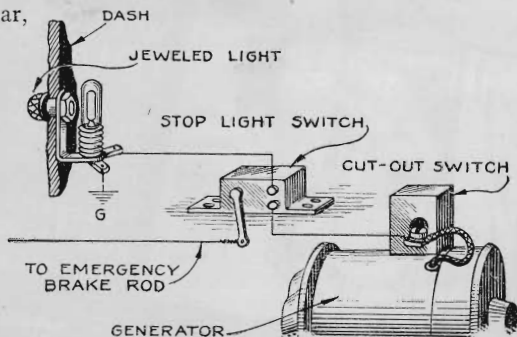


Fig. 3. Emergency brake indicator light, hooked to the generator, is on only when engine runs.

### CLOTH HOLDS SCREW

MANY useful ideas for holding screws so as to start them in hard-to-get-at places have appeared in POPULAR SCIENCE MONTHLY. Figure 4 shows one of the most ingenious tricks that we have described. First take an old rag, one that tears easily is best, and push the point of the screw through the cloth near the center. Next place the screw driver blade in the slot of the screw head and pull the cloth back over the blade with a twisting motion. The pull of the cloth will hold the screw in place on the end of the blade until you get it started in the thread. After it has taken hold, pull the cloth over the head of the screw.

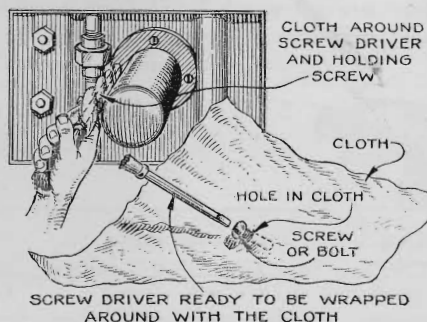
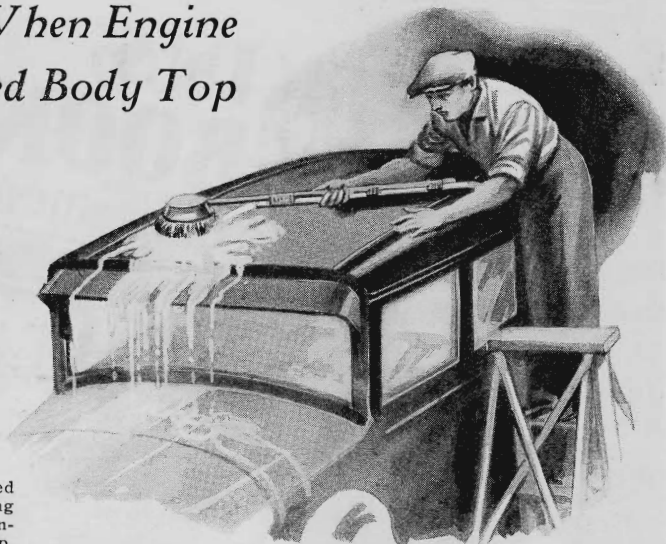


Fig. 4. Screw pushed through a cloth can be held securely and threaded into hard places.



### WASHING AUTO TOPS

AUTO owners who take care of their own cars often neglect to clean the top. A simple solution of this problem is shown in Fig. 2. Take a wall brush and attach to the handle a short length of garden hose, binding it at several points with tire tape. Place a hose union at the handle and have the brush end of the hose a few inches from the head of the brush. No nozzle is necessary. When you want to clean the top fasten the hose to the end of the garden hose and turn on the water. A few sweeps of the brush and the job is easily and quickly done.

### SUITCASE CARRIER

IF YOUR car is fitted with the mudguard bumpers now so popular, you can fit a carrier for a single suitcase or similar package as shown in Fig. 5. Most of these bumpers are of the double bar type and there is plenty of space for a board or

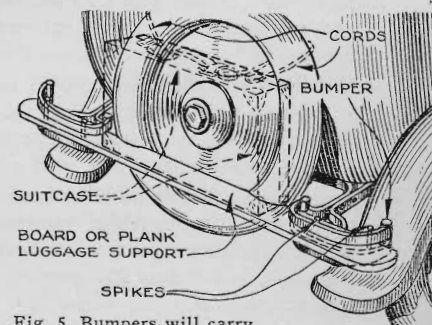


Fig. 5. Bumpers will carry board to which suitcase can be strapped while on a trip.

plank between the two bars as indicated. Temporarily, the board can be held in place with heavy nails driven in forward of the bumper bars. The top of the suitcase can be lashed to the spare tire.

While this luggage carrier does not look as well as a commercial one, it will serve in an emergency.



# Hints for Repairing Your Car

Old steering wheel with hand crank attached saves crawling from under car while at work—Welding rod can be used to remove broken axle

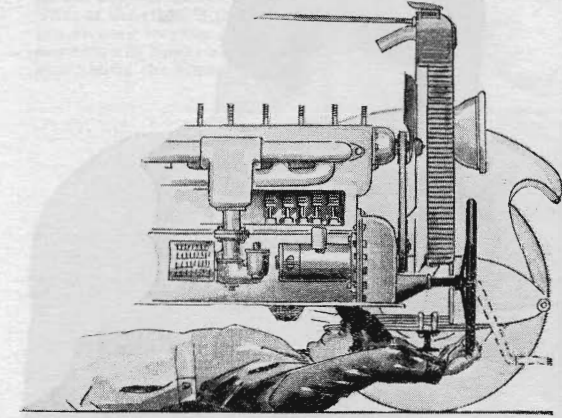


Fig. 1. How to attach hand crank to old steering wheel and save time in adjusting connecting rod bearings.

**M**ANY jobs around a car make a man wish he could be in two places at once. Adjusting connecting rod bearings is one of them because it is necessary to crawl out from underneath the car every time you want to turn the crank to a different position. Fig. 1, above, shows a simple way to turn the crank and remain under the car. Get an old steering wheel and fasten it to a spare hand crank.

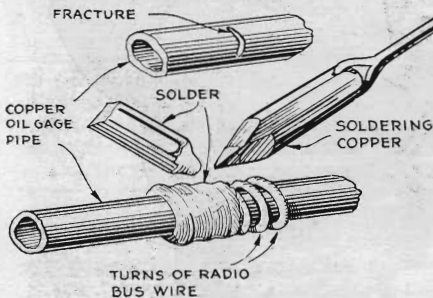


Fig. 2. Leak in pipe line can be repaired by winding wire around pipe and soldering.

PUNCTURES are hard enough to locate without having to spend time doing the job all over again if you happen to loose the place. Fig. 3, below, shows an easy way to prevent "losing" the hole and at the same time deflate the tube. Stick the end of an old oil can spout through the puncture.

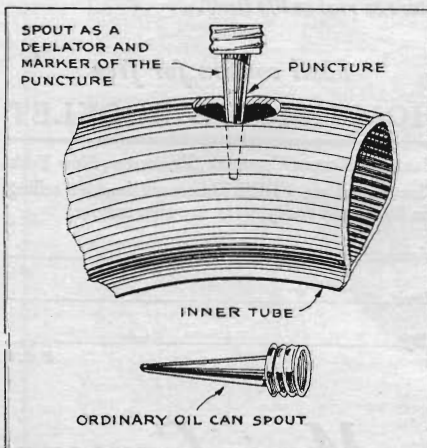


Fig. 3. When a puncture is found in a tire you can keep it located with an oil can spout.

WHEN a valve spring breaks, the broken pieces turn into each other and no longer exert any pressure on the end of the valve stem. While the correct cure is replacement, in an emergency an ordinary washer can be used to keep the two portions of the spring apart as shown in Fig. 5, at the right.

FIG. 2, at the left, shows a good way to repair a gasoline or oil pipe line that has sprung a leak or chafed through. First sandpaper the surface of the pipe down to the bright metal for a half inch each side of the leak. Then wind radio bus wire or No. 14 bare copper wire loosely around the pipe to cover the polished portion. Flow solder over the wire and pipe.

WHEN air pressure fails to clear out clogged oil lines try the method shown in

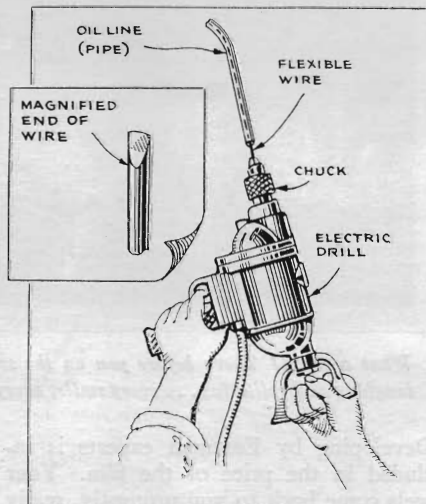


Fig. 4. Clogged oil lines can be cleared by use of a piece of piano wire, with chisel shaped end, inserted and then rotated.

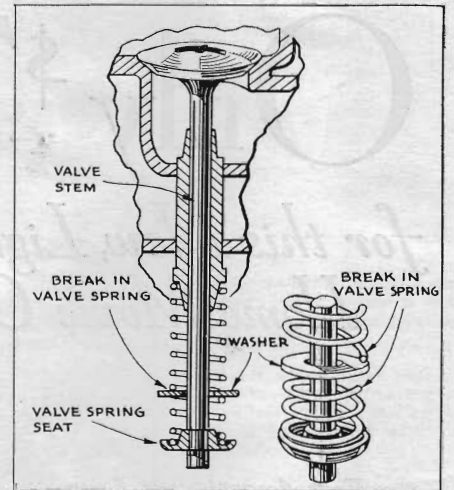


Fig. 5. When a valve spring is broken, it can be repaired temporarily with a washer.

Fig. 4, at the left. Take a piece of flexible wire, preferably piano wire, and grind one end chisel shaped as shown. Stone off the corners to prevent it from cutting into the pipe at the bends and use an electric drill or a hand drill to rotate it.

THE method of removing the remaining portion of a broken axle by means of a "lasso" of wire has been shown in a previous number of POPULAR SCIENCE MONTHLY. In many cases the axle breaks off so short that the "lasso" can't be used. Fig. 6, below, shows a way to weld a rod to the stub so it can be pulled. An arc is drawn and then the welding rod jammed against the axle stub as the switch is opened.

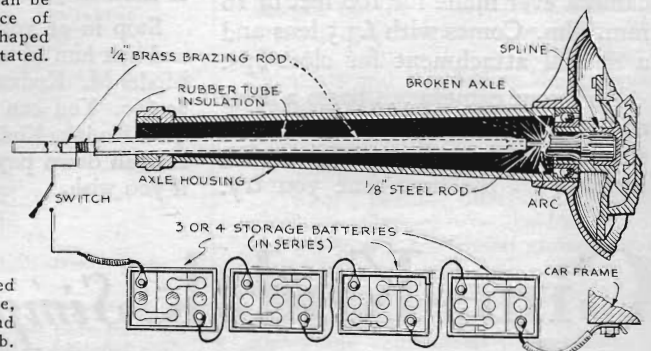


Fig. 6. A rod can be welded to the stub of a broken axle, as shown at the right, and used to pull out the stub.

# Ideas of Value to Car Workers

## Mechanical Assistant Helps in Taking Nuts from Oil Pan Bolts—Mica Tests Plugs for Internal Shorts

**A**S IT is impossible on most cars for one man to reach both the bolts and the nuts on the oil pan from one position, it is common practice to have an assistant remove the pan. Figure 3, at right, shows how to make a mechanical assistant. The counterweight at the end of bar *B* holds the socket wrench in place and a properly placed foot will keep it from turning.

A SPARK plug that functions in the open air may not work in the cylinder because the compressed charge of gas offers greater resistance to the spark than does air at atmospheric pressure. Figure 1, below, shows how to test a plug for internal shorts. Placing the mica as shown increases the gap and the spark jumps internally if the plug is defective.

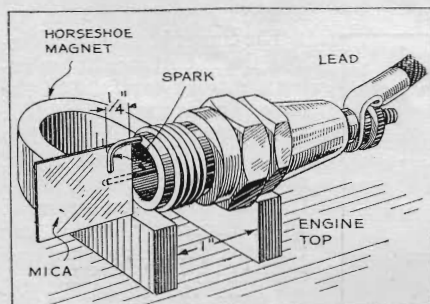


Fig. 1. Mica, placed as above, can be used to make a sure test of plugs for internal shorts.

WHEN air pressure is available, the simple method shown in Fig. 2, below, permits quick changes of the valve springs on overhead motors. The piston should be set exactly at top dead center before the air pressure is applied. The valve stem can be fitted to a spark plug of the take-apart type.

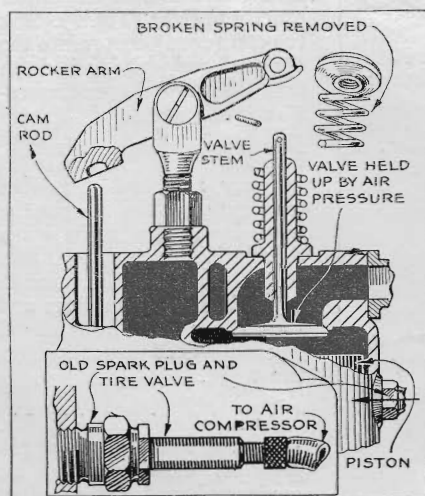


Fig. 2. Air pressure used to make a quick change of valve springs on overhead motor.

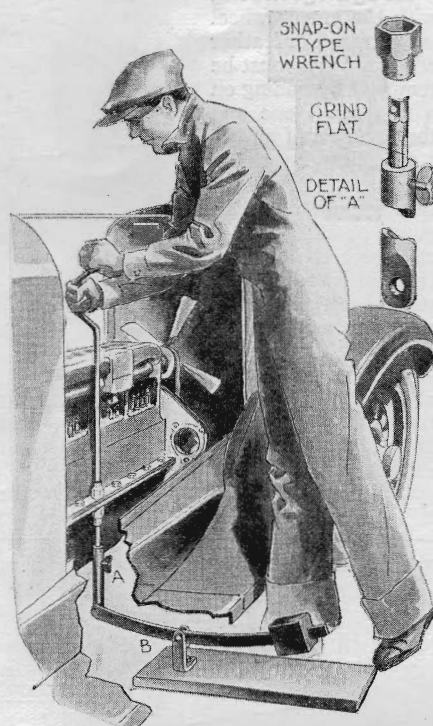


Fig. 3. Time and effort are saved by rigging mechanical assistant in turning oil pan nuts.



Fig. 4. Turning the windshield over and end for end gets scratches out of driver's vision.

AFTER a car is a year or two old, the owner discovers that the windshield glass in the path of the windshield wiper is covered with minute circular scratches that catch and reflect the light and so interfere with vision. These scratches are caused by tiny particles of sand from the road which are rubbed back and forth by the wiper, the rubber itself not being capable of causing scratches. Figure 4, above, shows how to make the windshield last longer by placing the scratched portion where it is not in the line of the driver's vision.

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THE principal cause of valve sticking is hard carbon deposited on the valve stems and in the valve guides. The carbon on the stems can be removed easily with a dull knife and the stems polished with crocus cloth. Figure 5, below, shows an easy way to remove the carbon deposit from the valve guide. Brass wire brushes to fit any size bore from a quarter inch to a half inch in diameter can be purchased in any sporting goods store.

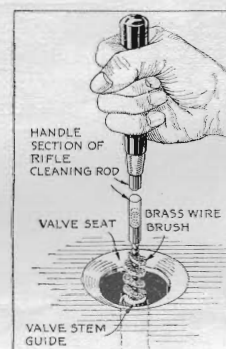


Fig. 5. With the use of this wire brush carbon is cleaned from the valve guide.

FIGURE 6, below, shows how to make a common flashlight into a circuit tester without spoiling it as a flashlight. Cut off the bottom end of an old flashlight and solder it to the cap as illustrated. The spring is insulated from the bottom cap by one or two fiber washers.

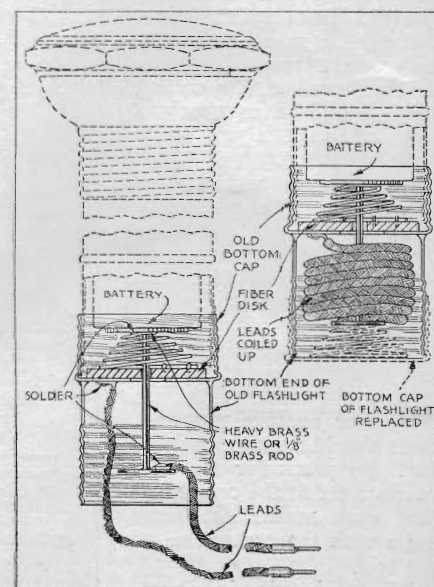


Fig. 6. How a flashlight can be used to test a circuit without spoiling it as a flashlight.



# New Ideas to Aid Car Workers

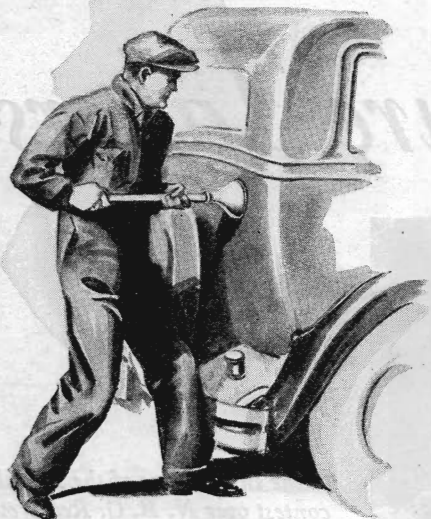


Fig. 1. With grease and a plumber's force cup, shallow dents can be taken out of body.

THE common method of removing dents in the auto body is by pounding from the inside with a soft hammer. To do this it is almost always necessary to take out a large section of the upholstery to get at the back of the dent.

Figure 1, above, shows a way to do the job that will work in some cases, and if it does a large amount of time is saved. If the dent is shallow, smear the surface with cup grease. Then apply a plumber's rubber force cup to the center of the dent and after expelling the air, give a quick jerk, which should remove the dent.

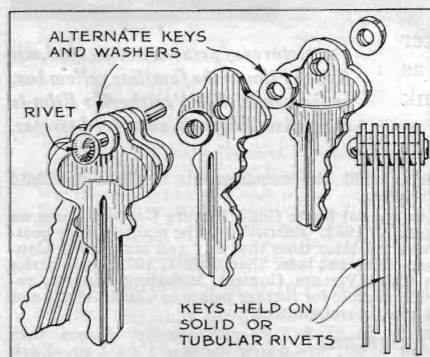


Fig. 2. Your keys won't rattle while car is in use if kept snugly on a rivet with washers.

SO LONG as there are auto thieves to steal cars, it will be necessary to use keys to lock them. Keys are, however, a nuisance. Unless the auto key is kept with the rest of your keys it is easy to leave it home. On the other hand, if the keys are kept on one ring or chain, they rattle against the dash when the car is in motion and may scratch the finish.

Figure 2, above, shows a simple way to keep the keys together so they can't rattle. Each key is separated from the next on the rivet by a small washer. Do the riveting so they can be turned without too much friction. When they become loose, after being in service a while, a blow with the hammer will tighten them again.

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OVERHEAD valve mechanism, when worn, has a tendency to become noisy. This applies more particularly to older models. With overhead valves, as with other types, the most annoying noise is that produced by a single valve mechanism that is a trifle farther out of adjustment or is worn more than the others. The whole mechanism can produce a considerable amount of noise without being annoying if the noise is steady and uniform.

Figure 3, below, shows the use of an auxiliary spring that can be fastened to each rocker arm to prevent play in the push rod and cam. By careful adjustment of the valve stem clearance and the use of these extra springs, the noise is reduced.

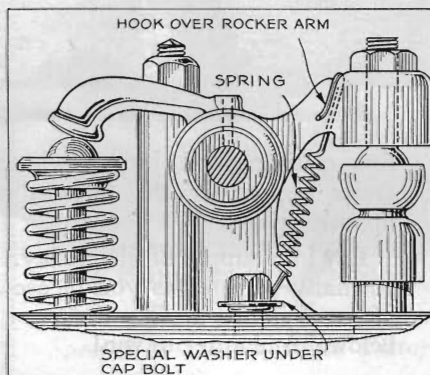


Fig. 3. An auxiliary spring fastened to each rocker arm on overhead valves will stop rattle.

INJECTING a small amount of kerosene into the air intake of the auto motor will make it smoke voluminously. This fact can be utilized in testing to find leaks. A test of this type often is extremely useful when you are troubled with exhaust gas leaking from the muffler getting into the body of the car.

With the motor running and the car outside where the light is good, squirt a little kerosene into the air intake and immediately look for leaks. Wherever there is a leak, you will see smoke coming out as shown in Fig. 4, below.

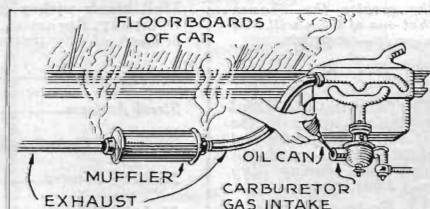


Fig. 4. Smoke from kerosene squirted into the air intake will reveal leaks in muffler.

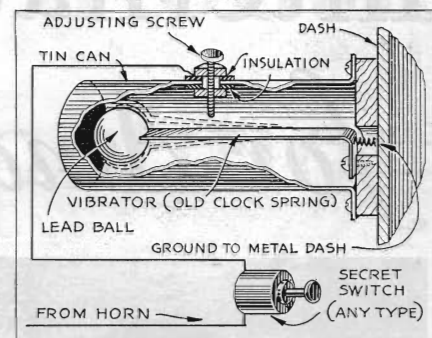


Fig. 5. This simple mechanism turns your horn into an alarm signal if car is touched.

FIGURE 5, above, shows how to build a device that will cause your horn to blow in a steady series of toots as long as it is being vibrated in any manner. If the secret switch is thrown when you leave the car, nobody can so much as step on the running board without causing the horn to start tooting a warning. The material needed to build this device consists of a tin can, a piece of spring taken from an old clock, a lead weight, a machine screw with a couple of nuts, and two leather or fiber washers. The ball shape of the lead weight is unimportant. You can flatten a piece of lead pipe and fold it over several times to make a suitable weight. The whole device can be attached to the back of the metal dash.

When you have it set up and wired as shown, turn on the switch and adjust the screw so that it does not quite make contact with the side of the spring. Then any motion of the car will cause the weight to vibrate and close the circuit.

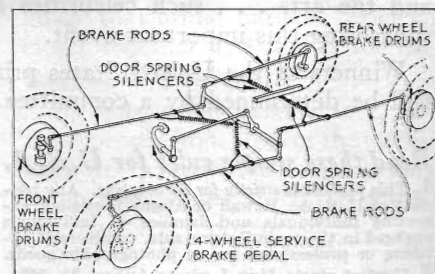


Fig. 6. Old screen door springs can be adjusted to your car to stop brake rattling.

BRAKE mechanism of the mechanical type becomes noisy when the wear has been sufficient to allow play at the clevis joints. Figure 6, above, shows the use of screen door springs or other coil springs to eliminate this rattling.

The diagram shows a suggested method of applying, but of course this can be varied to suit the particular car. The trick is to get the spring just tight enough to prevent any play at the loose joints and yet not so stiff as to cause additional wear or increase the pressure necessary to apply the brakes.

On long trips, when a rattle of this type develops, it is often possible to eliminate it for the duration of the trip by the aid of strong string with ordinary rubber bands to give the tension.

# Useful Hints for Car Machinists



Fig. 1. Old oil can and rod put together make a home-made engine stethoscope.

IT IS extremely difficult to locate the exact source of a noise in the auto motor merely by listening with the hood raised. The device shown above in Fig. 1 applies the principle of the doctor's stethoscope. Take an old oil can and discard the spout. Then solder a long thin metal rod to the bottom as shown. The can concentrates the noises travelling up the rod from the motor.

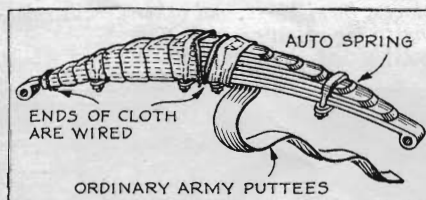


Fig. 2. Springs will grease themselves if they are wrapped in an old puttee soaked in oil.

Good riding qualities in the modern motor car depend on adequate lubrication of the springs and adjustment of the shock absorbers. The ordinary method of lubricating the springs is effective but must be repeated at short intervals. Fig. 2 above shows a way to make the springs self oiling and at the same time keep out dirt and grit. Army type puttees made of wool cloth strip can be obtained in many stores at low prices. Wind a pair of these around each spring, wiring the end in place, then soak them with the old oil drained from the car's crank case.

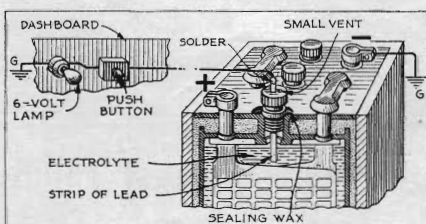


Fig. 3 shows how light on the dash can be hooked up to tell solution level in battery.

POPULAR SCIENCE MONTHLY awards each month a prize of \$10, in addition to regular space rates, for the best idea sent in for motorists. This month's prize goes to L. D. Youmans, Ravena, N. Y. (Figure 1).

UNTIL the solution in the auto storage battery drops considerably below the level of the top of the plates, the battery continues to give perfect service. However, operating the battery with the solution level too low ruins the electrical qualities of the portions of the plates left exposed. Fig. 3, at the bottom of the first column, shows a way to determine the solution level whenever desired merely by pressing a button on the dash.

Locate the filler cap nearest the positive pole of the battery (in batteries having the positive terminal grounded to the frame of the car the filler cap nearest the negative pole should be located). Drill a hole in this cap so as to make a tight fit around a lead rod. Adjust the length of the rod so it clears the tops of the plates when the cap is screwed tight.

Drill an extra venthole beside the lead rod. Connect the end of the lead rod to a switch on the dash and run a wire from the other terminal to a light, grounding the other terminal of the light. When the switch is on the light will burn as long as the solution level is above the tops of the plates.

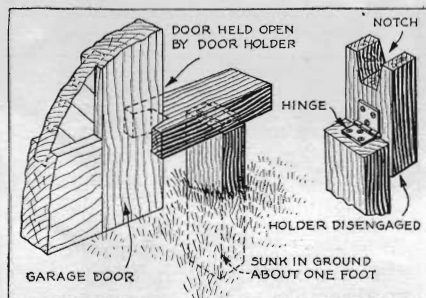


Fig. 4. Here is a new and simple device made of two by four to hold the garage door open.

MANY types of garage door stops have been described on this page. The one shown in Fig. 4 is especially easy to make. The size of lumber needed depends on the thickness and weight of the door. In most cases pieces cut from a length of two by four will do the job. The length of the notched piece, and also of the vertical section, can be varied to meet special requirements.

In any case be sure to have the vertical post set at least a foot in the ground and it is desirable to have the locking piece as close to the ground as possible to reduce the strain on the upright. Be sure that the locking piece is so placed that the hinge is much closer to the back than to the notched end.

IN THE case of an ordinary puncture, the regular five minute self vulcanizing patch or the cemented patch will do a good job. However, when the tire suffers a bad blow-out, the tube usually is ripped, sometimes for several inches, and often a piece actually is blown away. If the tube is old and near the end of its useful life it does not pay to repair such a bad break, but if the tube is relatively new, the method shown in Fig. 5, below, will prove effective.

First sandpaper all around the edges of the hole both inside and outside. Then cut a piece from an old inner tube and after sandpapering it on one side, cement it to the inside of the tube, thus repairing the hole from the inside. Then apply a patch to the outside in the usual way. Thus the hole will be patched and reinforced from both sides.

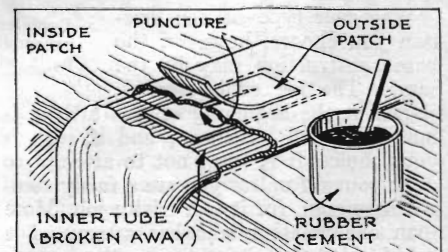


Fig. 5. A badly torn inner tube that is almost new can be saved with patch from old tube.

MANY types of old carburetors obtainable cheaply at the auto wrecking yard are of the type where the float chamber is separate from the mixing chamber. Such a carburetor can be altered as shown in Fig. 6 below to form a gasoline strainer. First saw off the float chamber. Then thread and plug the small hole through which gasoline flowed from the float chamber to the spray jet in the mixing chamber. In some cases a plug will be found on the opposite side to which the supply pipe can be attached. If not, fit to the spray jet supply hole after enlarging it to make a good fit.

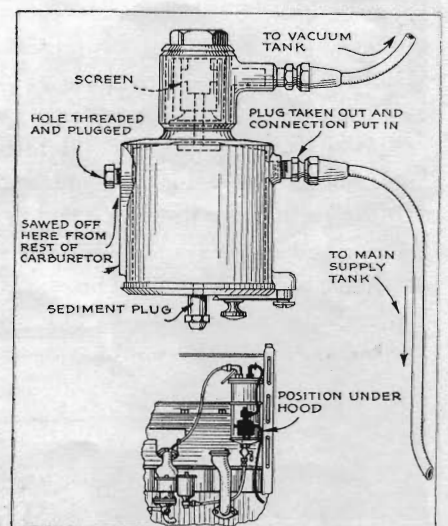


Fig. 6. Old carburetor, with float and mixing chambers separate, makes good gas strainer.



# Kinks That Simplify Auto Jobs

## Runway for Working Under Car—Foiling the Tire Thief

**M**ANY jobs on the front or rear running gear of an automobile are awkward because there is so little room to work. A pit solves the problem but is not practical for many owners.

A good solution is shown in Fig. 1. Short, strong runways are constructed from sections of two by four and two by six inch lumber. The angle of the approaching incline can be quite sharp. The runways must solidly support the weight of the car. Use heavy nails or No. 18 wood screws. If the incline is made steep it will be necessary to provide stops to keep the elevated platforms from sliding. Be sure to block the rear wheels when the front ones are elevated. Stored with their sides to the garage's rear wall, the runways will take little space.

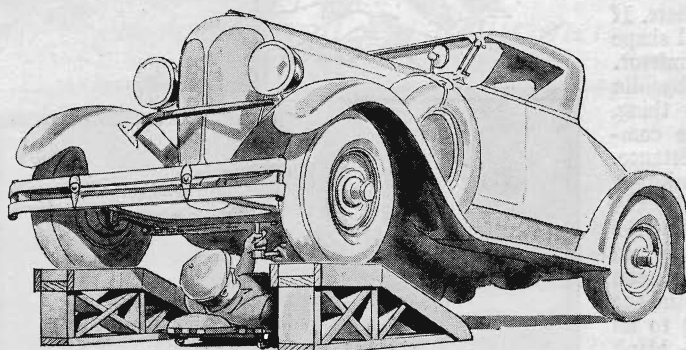


Fig. 1. By building a solid runway that will support your car it is possible to do work beneath it at your ease.

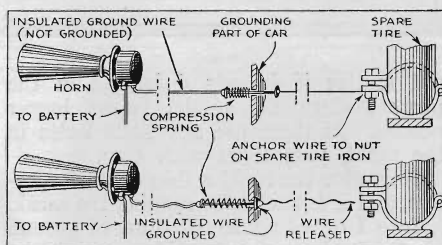


Fig. 3. This thief alarm can be adjusted to any car and will sound if spare is removed.

### ALARM PROTECTS SPARE

FIG. 3, above, shows an excellent way to protect the spare tire from theft. It operates electrically so that if anyone attempts to remove the tire the horn will start to blow and keep it up till shut off by the owner. The exact details of installations will, of course, depend on the type of car and the method of carrying the spare tire. When the string under the bolt head is released, the spring pulls the washer against the metal of the hole and completes the circuit.

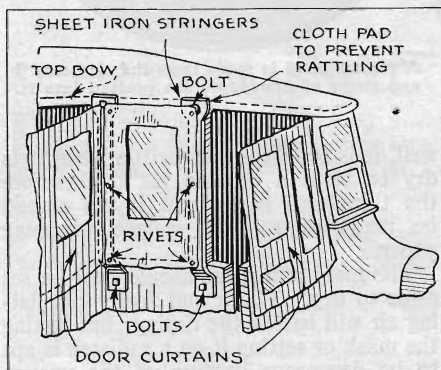


Fig. 2. Front edge of second curtain on car can be relieved of strain with metal strip.

### CURTAIN SUPPORTS

THE front edge of the second curtain on each side of the open touring car is subject to unusual strains. It stretches from the top to the front edge of the front seat without support and persons climbing in or out of the car bump into it and tear it away from the snap fasteners. A way to reinforce these curtains is shown in Fig. 2, above. A rib of heavy gage sheet metal is fastened to the body with a bolt through the hole that formerly held the snap fastener. The other end is bent around the bow of the top and a bolt used to clamp it. Then the snap fasteners for the front edge of the curtain are riveted to the metal strip. The final operation is to bend the sheet metal upright into a circular shape to give it additional strength.

This arrangement also prevents the curtains flapping in the wind and therefore helps to preserve the celluloid side lights. On old cars, supports also reinforce the top and prevent rattling.

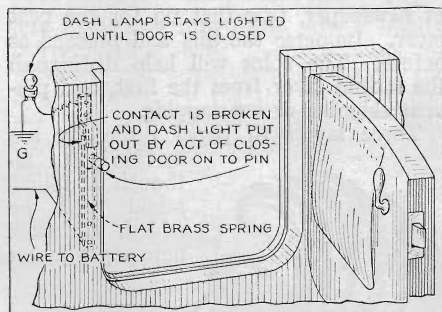


Fig. 5. A switch installed in your car will tell instantly whether all doors are locked.

**POPULAR SCIENCE MONTHLY** awards each month a prize of \$10, in addition to regular space rates, for the best idea sent in for motorists. This month's prize goes to Ralph M. Coombs, Canaseraga, N. Y. (Figure 3). Contributions are requested from all auto mechanics.

### "BLIND" BUSHING

It is often extremely difficult to remove a bushing from a "blind" hole. A method often recommended is to run a tap into the bushing which will cut threads so that a bolt can be screwed in. Force can be applied to the projecting head of the bolt and so pull out the bushing. However, Fig. 4, below, shows a simpler and quicker way to do the job. First fill the bushing solidly with soft cup grease. Then take a bolt or a piece of cold rolled stock that makes a fair sliding fit in the hole. Start this in the hole on top of the grease and give it a sharp blow with a hammer. The sudden pressure on the hidden end of the bushing will start it out of the hole.

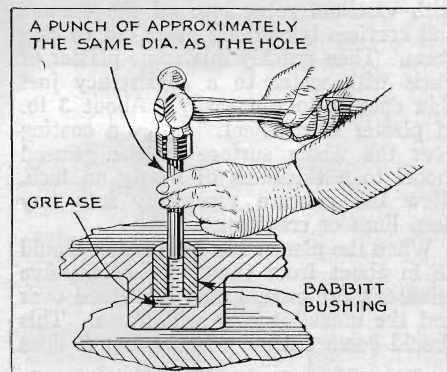


Fig. 4. By filling with grease and using bolt, bushing in blind hole can be removed.

### ELECTRIC DOOR SIGNAL

A DOOR not properly latched may swing open and cause a serious accident, especially if there are children in the car. And even when the rear seats are unoccupied, the swinging door may collide with a post or the side of the garage and be torn off or badly dented.

Fig. 5, at the left, shows a way to install a door indicator that will show at a glance whether all the doors are locked or not. The idea is to install in each door a switch such as is fitted to the house door in a burglar alarm system.

This switch can be set into the door so that it is operated by the latch as it sinks into the strike plate or by the door edge as it reaches the closed position. The most elaborate method is to install a separate jeweled light on the dash for each door, but it is also possible, by wiring the switches in series, to fix things so that only one light is necessary. In that case, opening any door will cause the light to glow. Use burglar alarm switches closing when the button is released or any simple switch of spring temper sheet brass.



# Hints of Value to Auto Workers

## Automatic Adjustment of Generator

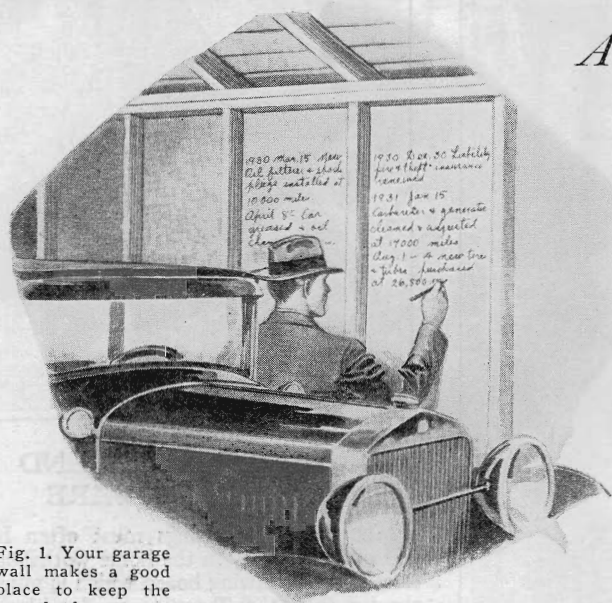


Fig. 1. Your garage wall makes a good place to keep the record of your car.

**K**EEPING a record of the various service and repair jobs that have been done on your automobile is, in theory, a relatively simple job. All you need is a small notebook in which to enter the various items. In practice, however, it doesn't work out that way. Being out of sight, the notebook is forgotten and the record is neglected until it is useless. What you need is a record that will be constantly in sight to act as a reminder to make entries when the jobs have been done and also to indicate when additional service operations are needed. If you keep your car in your own private garage, the walls of the garage form an ideal place for the car's service record. Or you can pin up large sheets of paper.

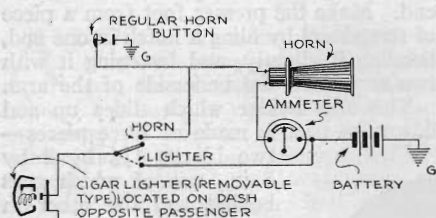


Fig. 2. Manner of connecting cigar lighter to switch to head off thieves.

**T**HE removable type cigar lighter is a convenience, but the fact that it is easily removed may result in its loss, especially in public garages.

If the lighter is wired as shown in Fig. 2, no one will steal it. Instead of connecting the wire from the cigar lighter to the battery cable back of the ammeter, the wire is attached to the movable contact terminal of a two-way switch as shown. One of the remaining switch terminals is connected to the battery cable back of the meter and the other terminal is connected to the wire leading to the horn button at any convenient point. When the switch is thrown to the horn button side, a pressure on the cigar lighter will blow the horn and the heating element in the lighter will not glow.

winding on the generator cut-out is used and the fixed resistance should be set to allow about five amperes to flow when the generator is set for ten or twelve amperes, the usual charging rate.

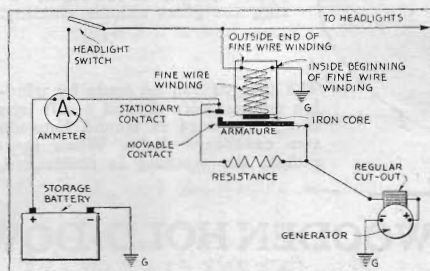


Fig. 3. By use of an extra generator cut-out charging rate is automatically changed.

**A**N excellent way to work out an electrical method of signaling left and right turns is shown in Fig. 4. The idea is to mount two lights, one on each mudguard, in such position that they can be seen from both front and rear. Each light is wired to its own steering wheel button. Red arrows against a black background could be used instead of lettering.

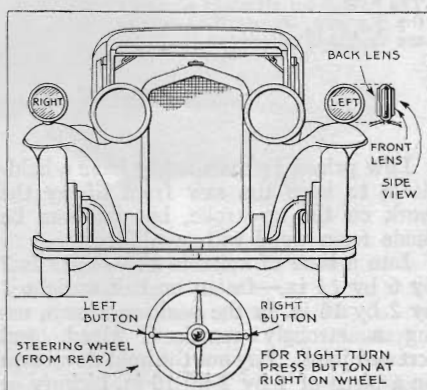


Fig. 4. Lights on each mudguard, wired to button on steering wheel, signal turns.

## WIN A \$10 PRIZE

Each month we award \$10 for the best idea sent in for motorists. This month's prize goes to Emil J. Novak, Omaha, Nebr. (Figure 3). Contributions are requested from all automobile mechanics and if published will be paid for at regular space rates.

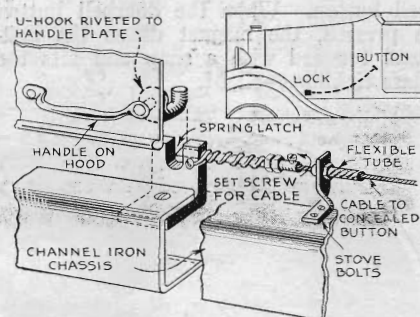


Fig. 5. By this method hood latches can be put on your car with operating buttons concealed under cowl but within reach.

**I**T IS often desirable, when the car is put in a public garage, to fix things so that no one can lift the hood and monkey with the engine. Figure 5, above, shows a simple way to add hood latches which can be operated by concealed buttons located under the cowl, one for each side of the hood.

The latch blocks are made from  $\frac{3}{8}$  by 2 inch bar iron bent to a right angle, slotted for the hooks and drilled for the latches as shown.

They are bolted to the frame of the car. The U-shaped hooks are bent from bolts and are held by the bolts that are used to attach the handles to the hood. The latches are made of  $\frac{1}{4}$ -inch stock beveled so that the hook will snap into place when the hood is lowered into position. The release buttons can be mounted either underneath the dash or on the dash.

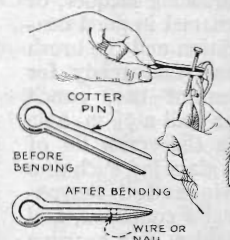


Fig. 6. Cotter pins can't slip out if nail is put between the split points.

**A**N EASY way to fix cotter pins so they may be slipped into tight holes is shown in Fig. 6. Place a nail or small piece of wire between the split points and squeeze the tips together with a pair of pliers as shown. This method is especially useful when the cotter has to be pushed into a hole hard to get at.

# Useful IDEAS for Car Drivers

## Mixture Cleans Carbon Out of Motor

**W**HILE undoubtedly the best method of removing the carbon from an automobile motor is to take off the cylinder head and scrape and polish it away, various solvents will have a beneficial effect in many cases. One of these mixtures consists of 16 ounces of kerosene, 2 ounces of glycerine and 2 ounces of hydrogen peroxide. The method of injecting this and other mixtures designed to remove carbon is shown in Fig. 1. A rubber tube is slipped over the spout of a small funnel and the end of the tube is inserted in the air intake opening of the carburetor. After the motor has been operated until it



Fig. 1. How to put carbon removing mixture in car.

coming out. If you find yourself a long way from a service station and the radiator develops a leak, remove the rubber tubing that is used to operate the windshield wiper, at the wiper, and slip this end over the end of the overflow pipe instead. If the radiator cap fits reasonably air tight, the reduced pressure created in the radiator will cause air to flow slowly through the leak into the radiator and while that is going on no water can get out. So long as the motor is running the radiator consequently will not leak a drop. Of course this method will not work with a severe break in the radiator such as an open seam in the upper or lower water compartments as the large opening would let through so much air that the carburetor mixture would be disturbed and the motor would miss.

**T**HE air pressure in tires should be regulated by the load in the car and not by sticking to some arbitrary figure.

For example, if you are going on a long drive alone, the car will ride better and the tires will not suffer if the pressure is dropped from three to five pounds in the rear shoes. The front shoes also could be operated at lower pressure with improved riding qualities but soft front tires often result in shimmy.

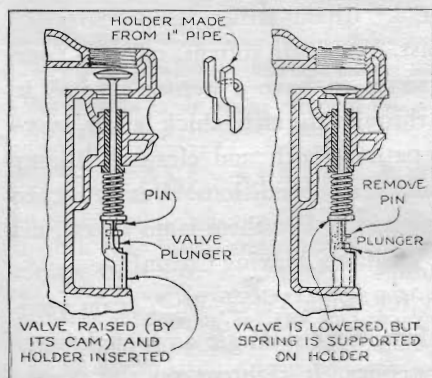


Fig. 2. A piece of iron pipe cut out on two sides is handy tool to hold up valve spring.

reaches normal temperature, it is set to operate at fairly high speed and then the mixture is slowly poured into the funnel. The rate at which the mixture is fed in should not cause the motor to miss.

**FIG. 2** shows a novel tool designed to facilitate quick valve grinding jobs. Instead of using a regular type of valve tool to lift the valve and thus permit the removal of the retaining pin and the spring, this tool is slipped in under the valve as shown while the latter is in the fully open position. Cranking the car one full turn will drop the valve plunger leaving the spring supported in the up position by the device. The pin can be removed and the valve ground without disturbing the spring, washer and so on.

To make this device, take a piece of iron pipe just long enough to slip under the washer when the valve is in the open position. With a hacksaw cut through the side of the pipe in a lengthwise direction. Then cut away

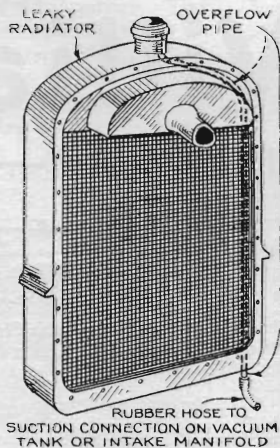


Fig. 4. How air pressure is used to stop leaky radiator.

enough of the lower portion to permit it to slip over the plunger bushing, opening up the cut in the pipe somewhat so that this will be accomplished without taking away a full half of the pipe. Next cut away the top portion in the same way but removing part of both sides as shown. Be sure the back edge of the top portion is not cut away as far as the lower portion.

**GLARE** from the headlights of cars approaching from the rear often shines in the rear vision mirror in a most annoying manner. Fig. 3 shows how to prevent this and still retain the use of the mirror. Make a simple frame of heavy iron wire slightly larger than the size of the mirror. Hinge this at the bottom under the top portion of the mirror mounting as shown. The details of the method depend on the method of construction. Cover the frame with a single layer of thin black silk cloth. If the cloth is thin enough, the headlights of cars behind will show through sufficiently.

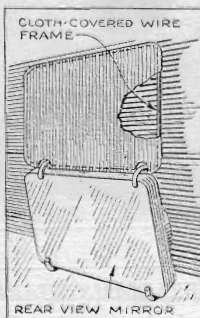


Fig. 3. Silk cloth used to shield car mirror.

**DOUBLE** filament bulbs are no longer useful in the headlights when one filament burns out. However these bulbs can be converted into single contact bulbs useful for dome, stop lights and so on by a simple job of soldering. If you examine such a bulb you will find that there are two contacts at opposite sides of the insulation that protrudes from the base. Take a soldering iron as shown in Fig. 5, and flow a little solder across the insulation joining the two contacts. Be careful that no solder flows down over the insulation and makes contact with the metal shell as this would cause a short circuit.

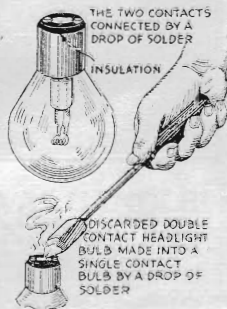


Fig. 5. Solder turns double filament bulb into fine stop light.

## WIN A \$10 PRIZE

Each month we award \$10 for the best idea sent in for motorists. This month's prize goes to R. H. Moore, Lombard, Ill. (Fig. 4). Contributions are requested from all automobile mechanics and if published will be paid for at regular space rates.



# New Ideas for Auto Workers

## Simple Wiring Scheme That Outwits Thieves

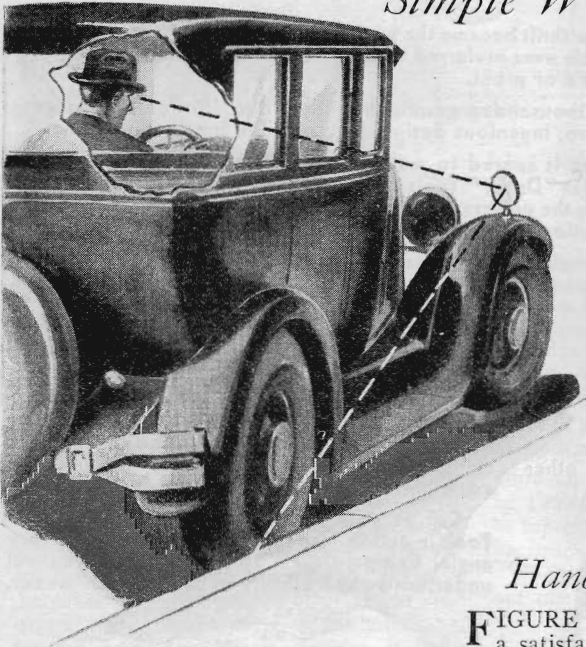


Fig. 1. Rear view mirror set on front right fender will prove helpful in parking the car

**M**ANY motorists have difficulty in telling how far the rear wheel is from the curb when attempting to back into a parking space. A neat way to eliminate this trouble is to fit a rear-vision mirror on the right front mudguard and set it so that it gives the driver a view of the road surface near the right rear wheel. On some cars with exceptionally high hoods and relatively low mudguards, it may be necessary to mount the mirror on an extension rod to make it visible from the driver's position. Testing will tell how long to make the rod.

### Dustpan For Garage

**M**OST owners of home garages have an old five-gallon can on hand. Use this to make the useful dustpan shown in Fig. 2. With a pair of tin shears, cut away the top half diagonally and then fit a wire bale handle. Place the holes for the handle close to the open end so that when you lift on it, the open end will swing up and allow the debris to slide toward the closed end of the container.

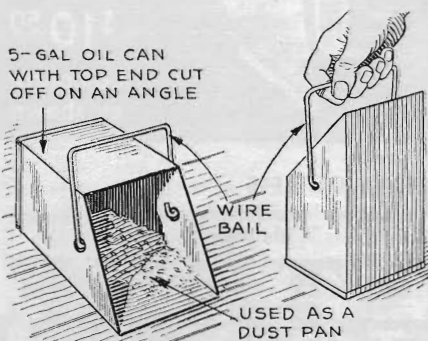


Fig. 2. Cutting away the top half of old oil can and fitting on handle makes a dustpan

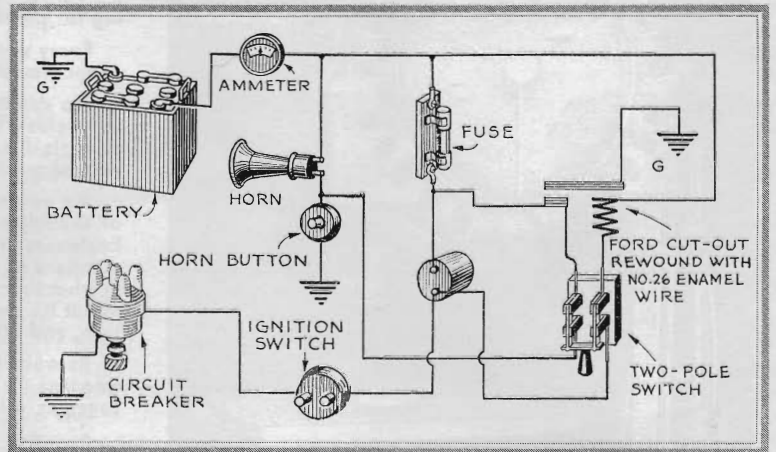


Fig. 4. Diagram shows how to wire car to sound horn and blow fuse if tampered with

### Handy Watch Holder

**FIGURE 3** shows a simple way to make a satisfactory watch holder for use in a car. It permits any standard smooth-backed watch to be held at any desired position on either the dash or the windshield. Remove the rubber vacuum cups from two of the various novelties so fitted and fasten them, back to back, by means of a screw and nut as indicated in the cut-away view. Moisten both cups and press on in the usual manner. The watch can be easily set or wound without removing it from the cups.

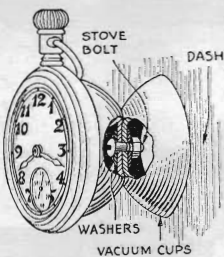


Fig. 3. Vacuum cups hold watch to the dash

### Stops Oil Waste

**ON SOME** cars, especially if the piston rings are not as tight as they might be, the gases escaping from the oil filling pipe carry a certain amount of oil in fine drops. This oil gets all over the engine and also represents a waste. Figure 5, at right, shows a simple type of home baffle arrangement that will serve to catch the droplets of oil and return the waste to the crankcase. It is made from a tin can of suitable size into which have been soldered two or more cheap tin funnels as shown in the illustration.

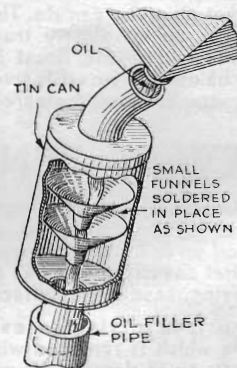


Fig. 5. Tin can with funnels in it makes baffle to catch waste oil

### Muffling the Exhaust

**WITH** modern motors, the snappy valve action causes a loud exhaust. The noise of the exhaust itself is reduced by the muffler, but there are vibrations produced in the steel walls of the muffler and pipe that cause drumming effects in the car interior.

A way to reduce these noises by damping the vibrations is shown in Fig. 6. Cover the muffler and pipe with asbestos starting at the motor end and working back toward the rear as far as may be necessary.



Fig. 6. Drumming from exhaust is muffled by covering pipe and muffler with asbestos

### WIN A \$10 PRIZE

Each month we award \$10 for the best idea sent in for motorists. This month's prize goes to Fred G. Mehnert, Chicago, Ill. (Fig. 4). Contributions are requested from all automobile mechanics and if published will be paid for at regular space rates.

# Timely Hints for All Who Work on Cars

## WIN A \$10 PRIZE

Each month we award \$10 for the best idea sent in for motorists. This month's prize goes to George F. Read, Everett, Mass. (Fig. 5). Contributions are requested from all automobile mechanics and if published will be paid for at regular space rates.

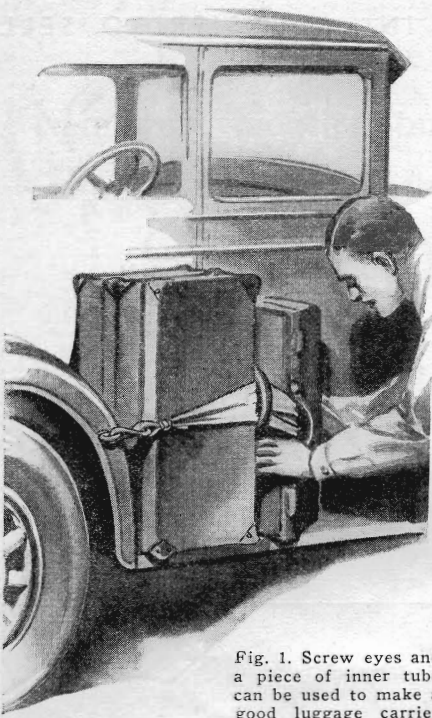


Fig. 1. Screw eyes and a piece of inner tube can be used to make a good luggage carrier

**M**ANY forms of automobile luggage carriers have been devised for the running board of the car. Figure 1 shows a handy arrangement that is especially suited for the occasional tourist who does not want a more cumbersome arrangement. Heavy screw eyes are fitted to the rear fender and the running board pan by drilling holes through these metal parts and screwing the eye into small blocks of wood underneath. A section of rubber cut from an old inner tube is fitted with strong harness snaps at each end. The rubber strap is doubled over and through the handles of suitcases and snapped into the screw eyes. Of course the position of the screw eyes and the length of the rubber inner tube strap will depend on the nature of the luggage to be carried.

## RADIATOR SIPHON

THE obvious method of removing water from the radiator to make room for alcohol or other anti-freeze liquid is to open the petcock and draw it off. A simpler method is to siphon the water out of the radiator from the filler cap opening. Figure 2 shows a way to do this without getting a mouth full of dirty radiator water. A copper or brass pipe is bent into U-shape and a double-ended rubber bulb is fitted to one end. The other end of the rubber bulb is fitted to a piece of rubber tube of any desired length, and a snap shut-off is placed on the tube just below the bulb. To start the siphon, squeeze the bulb flat and release it. Then release the snap and the flow starts at once. When enough water has been drawn out of the radiator, shut the snap valve again.

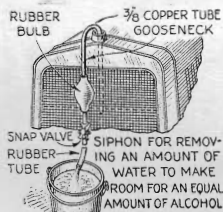


Fig. 2. With a rubber bulb fitted into U-shaped pipe, water from radiator is easily siphoned out

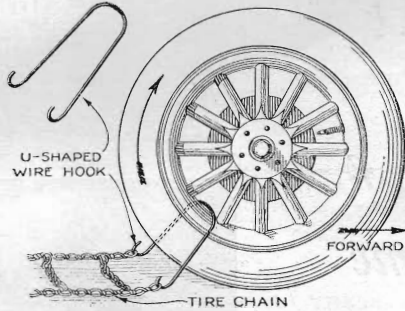


Fig. 3. You can avoid the muddy work of putting on tire chains by using a wire hook

## HOOK APPLIES CHAINS

FIGURE 3 shows a clean way to apply chains to tires. Take a heavy wire and bend hooks at each end as shown. Place this around the tire between the spokes and hook into the end links of the chain, which should be stretched out behind the wheel. Now run the car forward slowly and the chain will be pulled around the tire so that snapping the chain ends together is easy.

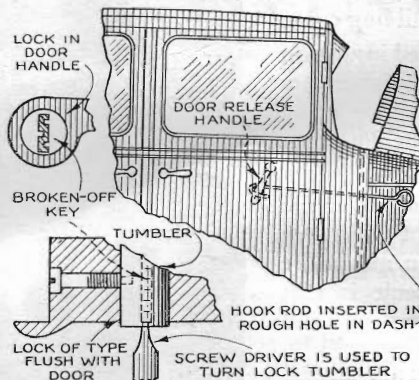


Fig. 4. A screw driver will turn a broken key, while a wire will open a car door if key is lost

## WHEN KEY BREAKS

IT is awkward to have the door key of your car break off in the lock. It is often possible to open the lock under such conditions with the aid of a screw driver. The portion of the key remaining in the lock will hold the pin tumblers in the unlock position, so if you can wedge the end of the screw driver into the key slot it can be turned. A lost key is still more serious, as it usually means breaking the lock, with a repair bill as a result. Figure 4 shows a way to get into the car when the key is lost. Drill a hole through the metal par-

tion at the rear of the engine and hook the inside door handle with a piece of wire.

## WINTER STARTING

FIGURE 5 shows a wiring arrangement that will make winter starting easier by automatically providing a fat, hot spark when most needed; that is, while the starter motor is cranking the engine. The equipment required is a stop-light switch and a six-volt, motorcycle-type storage battery. As you will note by the wiring arrangement, when the foot is placed on the starter pedal the current supply to the ignition system is cut off, leaving the motorcycle bat-

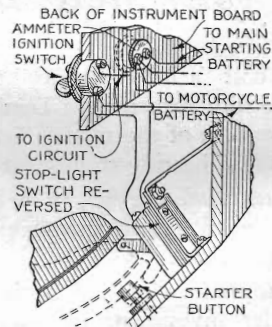


Fig. 5. Motorcycle storage battery can be installed for easy starting

tery to supply "juice" while the regular battery operates the starter motor. When the foot is removed, the stop-light switch connects the motorcycle battery in parallel with the regular battery so that it is kept charged.

## ANOTHER STARTER IDEA

IN OLD cars it is often noted that the self-starter does not seem to have much kick to it even when the battery is freshly charged and the self-starter motor itself is in perfect condition. This trouble is due to corrosion in the joints of the car's frame, which slow down the flow of current between the negative terminal of the battery and the frame of the self-starter motor. A remedy is shown in Fig. 6. Run the ground cable directly to the frame of the self-starter motor instead of to the nearest place on the car frame.

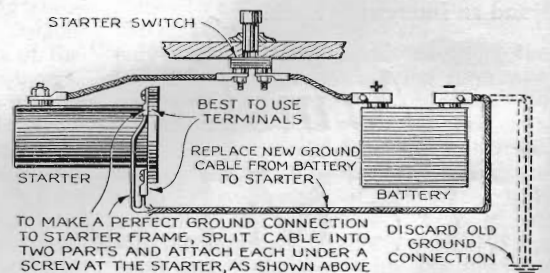


Fig. 6. Starting old cars is speeded up if the ground cable is run to self-starter frame instead of car frame